UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,574	12/04/2003	Thomas G. Anderson	010-03-002	2289

7590   05/06/2009

V. Gerald Grafe, esq.
P.O. Box 2689
Corrales, NM 87048

EXAMINER
BASOM, BLAINE T

ART UNIT	PAPER NUMBER
2173	

MAIL DATE	DELIVERY MODE
05/06/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

_____

Ex parte THOMAS G. ANDERSON

_____

Appeal 2008-4881
Application 10/729,574
Technology Center 2100

_____

Decided:[1] May 6, 2009

_____

Before JAY P. LUCAS, JOHN A. JEFFERY, and
CAROLYN D. THOMAS, *Administrative Patent Judges.*

JEFFERY, *Administrative Patent Judge.*

DECISION ON APPEAL

---

[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

Appellant appeals under 35 U.S.C. § 134 from the Examiner's rejection of claims 3-32 and 34-38. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

Appellant invented a method for efficient interaction of a user with a human-computer interface employing a haptic input device (e.g. a game controller with tactile feedback). Specifically, two paths are established: (1) an "object fundamental path," and (2) a "device fundamental path." The interface can detect motion of an input device along a device fundamental path, and use this detected motion to cause motion of an object in a computer application along an object fundamental path. The interface can also supply force feedback to the user resisting off-path motion of the device to guide the user to move the device along the device fundamental path.[2] Claim 3 is illustrative:

3. In a human-computer interface, a method of allowing a user of a haptic input device to affect the motion of an object in a computer application, comprising:

a)   Establishing an object fundamental path representing a path of motion of the object in the computer application;

b)   Establishing a device fundamental path in correspondence with the object fundamental path;

c)   Detecting motion of the haptic input device;

---

[2] *See generally* Spec. ¶¶ 0006-08; Abstract.

     d)   Moving the object in the computer application along the object fundamental path responsive to a component of haptic input device motion along the device fundamental path; and

     e)   Applying a force to the haptic input device responsive to a component of haptic input device motion not along the device fundamental path; and

     f)   Applying a force to the haptic input device responsive to interaction of the object with the application.

The Examiner relies on the following as evidence of unpatentability:

Frid-Nielsen	US 5,655,093	Aug. 5, 1997
Bertram	US 6,191,785 B1	Feb. 20, 2001
Rosenberg	US 6,219,032 B1	Apr. 17, 2001
Meredith	US 6,220,963 B1	Apr. 24, 2001
Baynton	US 6,277,030 B1	Aug. 21, 2001
Rosenberg ("Rosenberg II")	US 6,288,705 B1	Sep. 11, 2001
Shih	US 6,552,722 B1	Apr. 22, 2003
Gould	US 6,583,782 B1	Jun. 24, 2003
Stewart	US 6,801,187 B2	Oct. 5, 2004 (filed Jun. 22, 2001)

1. The Examiner rejected claims 3, 4, 7, 8, 11-13, 19-24, and 26-30 under 35 U.S.C. § 102(b) as anticipated by Rosenberg (Ans. 4-10).

2. The Examiner rejected claims 3, 5, 6, 35, and 36 under 35 U.S.C. § 102(e) as anticipated by Stewart (Ans. 10-11).

3. The Examiner rejected claim 9 under 35 U.S.C. § 103(a) as unpatentable over Rosenberg and Frid-Nielsen (Ans. 11-13).

4. The Examiner rejected claim 10 under 35 U.S.C. § 103(a) as unpatentable over Rosenberg and Bertram (Ans. 13-14).

5. The Examiner rejected claims 14 and 25 under 35 U.S.C. § 103(a) as unpatentable over Rosenberg and Rosenberg II (Ans. 15-16).

6. The Examiner rejected claim 15 under 35 U.S.C. § 103(a) as unpatentable over Rosenberg and Gould (Ans. 16-18).

7. The Examiner rejected claims 16-18 under 35 U.S.C. § 103(a) as unpatentable over Rosenberg, Gould, and Shih (Ans. 18-20).

8. The Examiner rejected claim 34 under 35 U.S.C. § 103(a) as unpatentable over Rosenberg, Gould, and Rosenberg II (Ans. 20-21).

9. The Examiner rejected claim 32 under 35 U.S.C. § 103(a) as unpatentable over Meredith and Rosenberg (Ans. 21-22).

10. The Examiner rejected claims 31 and 38 under 35 U.S.C. § 103(a) as unpatentable over Baynton, Rosenberg, and Meredith (Ans. 22-24).

11. The Examiner rejected claim 37 under 35 U.S.C. § 103(a) as unpatentable over Stewart and Rosenberg II (Ans. 24-25).

Rather than repeat the arguments of Appellant or the Examiner, we refer to the Brief and the Answer[3] for their respective details. In this decision, we have considered only those arguments actually made by Appellant. Arguments which Appellant could have made but did not make in the Brief have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

---

[3] Throughout this opinion, we refer to the Appeal Brief filed Jan. 25, 2006 and the Examiner's Answer mailed May 9, 2007.

THE ANTICIPATION REJECTION OVER ROSENBERG

Claims 3, 7, 8, and 10-13

In rejecting representative claim 3,[4] the Examiner relies principally on Rosenberg's application of force feedback to an interface device in the form of a "groove" force. According to the Examiner, this groove corresponds to an "object fundamental path" since it represents the path of motion of interface objects in computer applications (e.g., cursors and scroll bar "thumbs"). The Examiner adds that Rosenberg likewise teaches a "device fundamental path" in view of the path of the interface device and its correspondence to the groove. Furthermore, the Examiner notes that Rosenberg's system can also apply "collision forces" to the interface device responsive to various interactions with the object and the associated application (Ans. 4-6.)

Appellant argues that while Rosenberg's groove force feedback keeps a cursor within a region of the graphical user interface (GUI) (i.e., the scroll bar), bumps or other forces are applied when the user crosses window boundaries within the GUI. As such, Appellant argues, Rosenberg does not apply forces to an input device (1) based on interactions with an object with an application, *and* (2) while the cursor is in a groove. Based on this deficiency, Appellant concludes that Rosenberg does not apply forces to the

---

[4] Appellant argues claims 3, 7, 8, 10, 11, and 13 together as a group. *See* Br. 13-14. Although Appellant did not include claim 12 in this group, it was not separately argued. *See* Br. 13-19. Accordingly, we include claim 12 in this group and select claim 3 as representative. *See* 37 C.F.R. § 41.37(c)(1)(vii).

device *while* the user moves an input device along a "device fundamental path." (Br. 13-14.) Appellant adds that Rosenberg controls cursors—not objects—in an application. (Br. 14.)

The issues before us, then, are as follows:

ISSUES

Has Appellant shown that the Examiner erred in rejecting claim 3 under § 102 by finding that:

(1) Rosenberg applies a force to a haptic input device responsive to (a) a component of haptic input device motion not along the "device fundamental path," and (b) interaction of an object of a computer application with the application?

(2) Rosenberg's cursor and scroll bar "thumb" reasonably correspond to an "object" as claimed?

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence:

1. Rosenberg discloses a system that provides force feedback to a user 22 operating a human/computer interface device 14 in conjunction with a GUI displayed by a host computer system 12. A user object 34 (e.g., a joystick or mouse) controls a graphical object (e.g., a cursor) within the GUI. The host computer sends a signal to the interface device to apply a force sensation to the physical object, where the force sensation is associated with graphical objects and operating system functions of the GUI. The force sensation is also determined by the location of the cursor in the GUI with

respect to targets associated with graphical objects (i.e., icons, windows, pull-down menus, scroll bars, and buttons). (Rosenberg, Abstract; col. 2, l. 53 − col. 3, l. 36; col. 6, ll. 37-65; col. 13, l. 65 − col. 14, l. 9; Fig. 1.)

2. Figure 14 lists position control host commands and associated parameters. These commands comprise various position control forces 334 including a groove force. (Rosenberg, col. 37, l. 28 − col. 38, l. 29; Fig. 14.)

3. The groove force as a function of displacement is graphed in Figure 15 and provides a linear detent sensation along a given degree of freedom shown by ramps 344. As such, the user object feels like it is captured in a "groove" via a restoring force centered about a center groove position "C" to keep the stick in the groove. A deadband DB, however, allows the user object to move freely near the center groove position. The magnitude (stiffness) parameter specifies the amount of force or resistance applied. (Rosenberg, col. 38, l. 38 − col. 39, l. 9; Fig. 15.)

4. The groove force can be applied to a GUI 500. As shown in Figure 20c, an external force of target 559 can be provided as external grooves 561. When cursor 506 is moved into a groove, the grooves apply resistive forces to resist movement out of the groove, yet freely allow movement within the groove. (Rosenberg, col. 57, l. 30 − col. 58, l. 8; Fig. 20c.)

5. In Figure 21, GUI 500 includes a scroll bar 581 with a guide 582 in which a "thumb" 580 moves via cursor 506. An attractive external force is associated with the guide so that the cursor is attracted to a field origin point "N" within thumb 580. Alternatively, the dead region of guide 582 has zero width so that the cursor is always attracted to a point halfway across the width of the guide (i.e., the middle line "L"). (Rosenberg, col. 59, l. 49 − col. 60 l. 23; Fig. 21.)

6. "Collision" forces can be applied to user object 34 if the cursor moves over or into certain edges, objects, or regions in GUI 500 that are designated as "solid" objects. (Rosenberg, col. 60, ll. 46-62; Fig. 21.)

7. Sensations of physical bumps or textures can be applied to user object 34 as the user moves the cursor across the screen of a GUI to indicate that the cursor has been positioned within a given region or crossed a particular boundary. (Rosenberg, col. 44, l. 47 – col. 45, l. 8; Fig. 18.)

8. Cursor 506 can be assigned a mass of its own so that the user object will feel collision forces in accordance with the mass of cursor 506, the velocity of the cursor moving across the screen, and an assigned compliance of the cursor and the object moved into. (Rosenberg, col. 60, ll. 54-58.)

9. Thumb 580 can be assigned inertia forces such that user can feel the inertia "mass" of the thumb when moving it along guide 582. (Rosenberg, col. 60, ll. 24-26.)

10. Upon moving the cursor to the desired target, the user maintains the cursor at the target while providing a "command gesture" associated with a physical action such as (1) pressing a button; (2) squeezing a trigger; (3) depressing a pedal; (4) or making some other gesture to command the execution of a particular operating system function associated with the graphical object/target. For example, the "click" (press) of a button located on a mouse or joystick while the cursor is on an icon allows an application program to execute. Also, clicking this button while the cursor is on part of a window allows the user to drag the window across the screen by moving

the user object. The command gesture can also modify forces (e.g., remove the forces applied in a certain region or target in GUI 500). (Rosenberg, col. 45, l. 61 – col. 46, l. 12.)

11. Users can designate particular magnitudes of forces associated with targets via a menu command or other standard method. (Rosenberg, col. 52, ll. 54-59.) Additionally, for safety reasons, users can also override and deactivate actuators 30 via a safety switch 41. (Rosenberg, col. 13, ll. 37-64.)

12. Appellant's Specification notes that "[t]he user is provided a switch which, when actuated, causes the interface to provide an interaction according to a device fundamental path. The switch can comprise . . . a defined motion of the input device (e.g., a tight circle motion) . . . ." (Spec. 9:13-17.)

PRINCIPLES OF LAW

Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. *RCA Corp. v. Appl. Dig. Data Sys., Inc.*, 730 F.2d 1440, 1444 (Fed. Cir. 1984); *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554 (Fed. Cir. 1983).

"Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (citations omitted).

ANALYSIS

Claims 3, 7, 8, and 10-13

Based on the record before us, we find no error in the Examiner's anticipation rejection of representative claim 3 which calls for, in pertinent part, applying a force to a haptic input device responsive to (a) a component of haptic input device motion not along the device fundamental path, and (b) interaction of an object of a computer application with the application.

At the outset, we agree with the Examiner (Ans. 28) that the cursor in Rosenberg reasonably constitutes an "object" in a computer application as claimed. Not only does the Specification fail to specifically define the term "object" as the Examiner indicates, Rosenberg actually uses this very term in the Abstract in connection with the cursor. *See* FF 1 (noting that a cursor is an exemplary "graphical object"). We reach a similar conclusion with respect to Rosenberg's scroll bar "thumb" (FF 5) as we see no reason why it, too, could not function at least as a graphical "object."

Turning to the rejection, the Examiner equates the groove of Rosenberg's "groove force" with the recited "object fundamental path." The Examiner also finds that Rosenberg also establishes a "device fundamental path" associated with the interface device that corresponds to this "object fundamental path." (Ans. 5-6.) These findings are undisputed.

As the Examiner indicates (Ans. 27), the claims do not recite that the force applied to the input device occurs *while* the user moves the input device along the device fundamental path. Appellant's arguments in this

regard (Br. 13-14) are simply not commensurate with the scope of the claim which, as the Examiner indicates, merely recites applying force to the input device responsive to the two conditions (a) and (b) above.

As such, limitation (e) of claim 3 is fully met by Rosenberg's applying forces to the input device responsive to a component of device motion that is not on the device fundamental path (e.g., when the cursor is not in the groove). *See, e.g.*, FF 6 (applying collision forces if cursor moves over or into "solid" objects); *see also* FF 7 (applying bumps or textures to the user object as the user moves the cursor across the screen).

Moreover, the disputed limitations are fully met by the resisting forces associated with Rosenberg's groove force (FF 3-4) that can be applied to a GUI (FF 4-5). Not only do these implementations apply forces to the input device responsive to components of forces not along the device fundamental path (i.e., in a direction away from the groove), but they also apply forces responsive to object interactions with the application (e.g., moving the cursor within the groove). *See id.*

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of representative claim 3. Therefore, we will sustain the Examiner's rejection of that claim, and claims 7, 8, 10, 11, and 13 which fall with claim 3.

Claim 4

We will also sustain the Examiner's rejection of claim 4 which calls for, in pertinent part, that the applied forces provide a perception of momentum and inertia of the input device corresponding to that of the

object. We agree with the Examiner (Ans. 30-31) that nothing in the claim precludes the Rosenberg's collision forces applied to the user object in accordance with the cursor's mass and velocity. *See* FF 8 and 6. Nor does the claim preclude the user's feeling inertia mass forces as they move the thumb along the guide in the scroll bar. *See* FF 9 and 4.

Although Appellant argues that objects with simulated mass or inertia move within groove-constrained slider bars (Br. 14-15), Rosenberg's cursor does, in fact, move within such a scroll bar. *See* FF 5. In any event, the claim is fully met by other motion that is outside scroll bars. *See, e.g.,* FF 8 and 6.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of claim 4. Therefore, we will sustain the Examiner's rejection of that claim.

Claims 19 and 20

We will also sustain the Examiner's rejection of representative claim 19 which calls for, in pertinent part, a characteristic of the object being responsive to input device motion off the device fundamental path. We find no error in the Examiner's reliance on Rosenberg's command gesture functionality (FF 10) as meeting this limitation. Notably, these command gestures are associated with motion of the input device (e.g., pressing a button, squeezing a trigger, depressing a pedal) (*Id.*) that is off the device fundamental path.

While these motions execute particular operating system functions as Appellant indicates (Br. 15), they nonetheless impart distinctive *characteristics* to the object (e.g., cursor) associated with these functions—

even under Appellant's definitions of the term. For example, when the user presses a mouse button while the cursor is on an icon, the corresponding application executes (FF 10) and, as a result, the *selection characteristics* of the cursor change commensurate with the newly-launched application. That is, after launching the new application, the "distinguishing traits, qualities, or properties" regarding the cursor's selection capabilities change accordingly.

Likewise, clicking this button while the cursor is on part of a window allows the user to drag the window across the screen by moving the user object. (FF 10.) In this instance, the cursor's *target movement characteristics* change after clicking by providing the ability to drag the underlying window. Additionally, these command gestures can even remove the very forces applied to the object (*Id.*): a feature that also would change its characteristics.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of representative claim 19. Therefore, we will sustain the Examiner's rejection of that claim, and claim 20 not separately argued.

Claim 21

We will also sustain the Examiner's rejection of claim 21 which calls for, in pertinent part, the magnitude of the force being partially dependent on the position of the object along the object fundamental path. Although Appellant argues that Rosenberg does not vary forces as the cursor moves along the slider bar (Br. 15-16), we agree with the Examiner (Ans. 34) that Rosenberg centering force applied to the cursor in the scroll bar (FF 5) meets

this limitation. By attracting the cursor to the guide's midpoint, the magnitude of the force would be at least partially dependent on the object's position along the object fundamental path.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of claim 21. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 22

We will also sustain the Examiner's rejection of claim 22 which calls for, in pertinent part, the magnitude of the force being partially dependent on the interaction of the object with the application. We agree with the Examiner (Ans. 37) that Rosenberg's varying the force according to the cursor's distance from the center of the groove (FF 3 and 5) reasonably meets this limitation since nothing in the claim precludes the user's movement of the cursor itself as "interaction" with the application.

We further note that nothing in the claim precludes the other forces applied based on various cursor movements (i.e., interactions) (*see, e.g.,* FF 6 and 7), or even command gesture interactions which also can vary the force magnitude. *See* FF 10. And as the Examiner indicates (Ans. 38), users can specify particular magnitudes of forces associated with targets (FF 11) such that force magnitudes would be partially dependent on object interaction with those particular targets.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of claim 22. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 23

We will also sustain the Examiner's rejection of claim 23 which calls for, in pertinent part, the force magnitude being partially dependent on a user-assistance parameter of the interface. We agree with the Examiner (Ans. 39-40) that nothing in the claim precludes the recited "user-assistance parameter" as reading on Rosenberg's magnitude (stiffness) parameter that specifies the amount of force or resistance applied in connection with the groove force. *See* FF 3. We see no reason why the force magnitude would not at least partially depend on this parameter—a dependence all but indicated by its very title. We further see no reason why this parameter (or any of the other parameters associated with the position control commands and forces (FF 2)) would not constitute a "user-assistance" parameter. The Examiner's point in this regard (Ans. 41-42) is well taken.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of claim 23. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 24

We will also sustain the Examiner's rejection of claim 24 which calls for, in pertinent part, establishing the user-assistance parameter by a measure of the user's proficiency in manipulating the input device. Rosenberg's system is certainly designed to assist users of varying proficiency levels effectively use GUIs via force feedback as the Examiner indicates (Ans. 45). And while users *could* increase the force feedback magnitude parameter if they needed more assistance as the Examiner surmises (*see* FF 3 and 11),

there is simply nothing in Rosenberg that such an adjustment was actually performed based on such user proficiency considerations, let alone a *measure* of the user's proficiency as claimed.

Although the Examiner makes a point regarding what skilled artisans would understand regarding the relationship between the magnitude parameter and a user's skill level (Ans. 45), this line of reasoning is, at best, based on an inference that does not necessarily follow from the teachings within the four corners of the Rosenberg reference. It is well settled that "[i]nherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Robertson*, 169 F.3d at 745 (citations omitted). As such, even if it were *probable* that less skilled users (i.e., users needing more assistance) would have increased the magnitude parameter as the Examiner seems to suggest, that alone would not be enough for anticipation. Rather, such a relationship between the magnitude parameter and a measure of user proficiency must be *necessarily present* in the reference. It is not.

Nevertheless, the scope of claim 24 does not preclude "establishing" a user-assistance parameter by selectively activating or deactivating Rosenberg's force feedback feature via a safety switch. *See* FF 11. By overriding the force feedback feature, a "user-assistance parameter" would, in effect, be established by a measure of the user's perceived proficiency in manipulating the input device, at least during adverse or unsafe conditions. *See id.*

Moreover, the force characteristics of the groove force itself (FF 3) would, in effect, establish a "user-assistance parameter" by a measure of the user's proficiency in manipulating the input device in view of the deadband

DB that allows free movement near the center groove position, as well as the gradual increasing of force away from the center. *See id.* These zones of force were not arbitrarily created, but are rather based on a user's proficiency in manipulation of an object within a groove—a feature that ultimately assists the user to that end. *See* Rosenberg, col. 1, l. 65 – col. 2, l. 59.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of claim 24. Therefore, we will sustain the Examiner's rejection of that claim.

Claims 26, 27, and 30

We will also sustain the Examiner's rejection of representative claim 26 which calls for, in pertinent part, establishing a device fundamental path by (1) determining when the user supplies a motion-initiation signal, and *then* (2) establishing the device fundamental path according to a defined device path and a cursor position when the motion-initiation signal was supplied.

We see no error in the Examiner's position (Ans. 46-47) that the motion-initiation signal is supplied when the user positions the cursor within a region associated with a groove force (e.g., a scroll bar). *See* FF 3-5. In this case, the groove force (i.e., the device fundamental path) would not only be established *after* moving the cursor within the target, but would also be established according to the cursor's position.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of representative claim 26. Therefore, we will

sustain the Examiner's rejection of that claim, and claims 27 and 30 not separately argued.

Claims 28 and 29

We will also sustain the Examiner's rejection of representative claim 28 which calls for the motion-initiation signal to comprise a switch actuated by the user. We see no error in the Examiner's position (Ans. 49-50) that positioning the cursor within a region associated with a groove force (e.g., a scroll bar) constitutes actuating a "switch." This conclusion is consistent with Appellant's Specification which expressly states that a switch can include defined motion of an input device. (FF 12.) As we indicated above in connection with claim 26, such positioning of the cursor would cause a motion-initiation signal to be supplied and therefore, in effect, function as a "switch" by virtue of this motion.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of representative claim 28. Therefore, we will sustain the Examiner's rejection of that claim, and claim 29 not separately argued.

THE ANTICIPATION REJECTION OVER STEWART

Regarding claim 3, the Examiner finds that the displayed geometric model in Stewart corresponds to the "object fundamental path" since it designates a path that the input device must follow to "feel" the geometric

object that the model represents. Additionally, the model's "virtual surface" is said to correspond to the "device fundamental path,"[5] and that force is applied to the input device to constrain the user's hand onto the virtual surface. The Examiner also notes that force feedback is also applied when the user modifies the geometric model. (Ans. 10-11.)

Appellant argues that claim 3 is limited to an interface that allows distinct object path and object interaction, but the Examiner's relies on a different mode of operation (i.e., the modification mode) for this feature. (Br. 19-20.)

The Examiner responds that claim 3 does not require applying the forces in steps (e) and (f) simultaneously. As such, the Examiner reasons, the claim does not preclude the user switching from the browsing mode to the modification mode, and the respective forces applied in each mode. (Ans. 51-53.)

The issue before us, then, is as follows:

ISSUE

Has Appellant shown that the Examiner erred in finding that Stewart applies a force to a haptic input device responsive to (1) a component of the input device motion not along the device fundamental path, and (2) interaction of the object with the application in rejecting representative claim 3 under § 102?

---

[5] *But see* Br. 10 (characterizing the Examiner's reliance on Stewart's virtual surface as corresponding to the "object path" in claim 3).

FINDINGS OF FACT

The record supports the following additional findings of fact (FF) by a preponderance of the evidence:

13. Stewart discloses a system 10 for interactively evaluating and manipulating a geometric model 22 (e.g., a vehicle design) via a haptic interface 12 operatively coupled to a computer system 16. The haptic interface includes a haptic end effector device 18 (e.g., a stylus, pen, or similar gripping device) that transmits information between a user 14 and a geometric model as the user browses or edits the model's surface using the end effector device. (Stewart, Abstract; col. 4, ll. 22-45; Figs. 1-3.)

14. The haptic interface 12 controls position, orientation, and force feedback between the user 14, computer system 16, and the geometric model. To this end, an active force is applied to the end effector device 18 to constrain the user's hand onto a virtual surface 20 representing a surface of the geometric model 22. By forcing the end effector device 18 to stick to the virtual surface 20 representing the geometric model, the user receives tactile information to enable the user to explore, feel, and manipulate the geometric model and assess design quality. (Stewart, col. 4, ll. 25-28; col. 5, l. 62 − col. 7, l. 13; Figs 1-4A (Step 115 (browse mode)).)

15. Similarly, forcing the end effector device 18 to stick to the virtual surface 20 enables the user to edit the surface via haptic sculpting. To this end, the user can enter the edit mode via an activation signal. (Stewart, col. 4, ll. 54-65; col. 7, ll. 14-38; Fig 4A (Step 120).)

16. Figure 4C details a methodology for editing a fixed point in parametric space on virtual surface 20. In Step 235, force feedback is computed representing the stick-to-surface/stick-to-pen force and surface

property feedback force. In Step 240, these forces are added together and applied to end effector device 18. (Stewart, col. 10, ll. 9-55; Fig. 4C.)

ANALYSIS

Claim 3

We will sustain the Examiner's anticipation rejection of claim 3 based on Stewart. As the Examiner indicates (Ans. 51-53), the scope of claim 3 does not preclude applying forces in the browse and edit modes, respectively. As such, we agree with the Examiner that Stewart's system applies a force to an input device responsive to a component of the input device motion not along the device fundamental path while browsing. *See* FF 13-14. We also find no error in the Examiner's position that Stewart also applies a force to the input device responsive interaction of the object with the application in the edit mode—a mode that would involve interaction of the object with the application. *See* FF 15-16. Appellant's argument that Stewart's object path also serves as the interaction with the application (Br. 20) is simply not commensurate with the scope of the claim.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's anticipation rejection of claim 3 over Stewart. Therefore, we will sustain the Examiner's rejection of that claim.

Claims 5 and 6

We will also sustain the Examiner's rejection of claims 5 and 6 calling for the shape of the object and device fundamental paths to be dependent on the application state, respectively. We agree with the Examiner (Ans.

53-55) that nothing in the claim precludes Stewart's editing mode that would yield a particular "application state" from a number of such states. As such, the shape of the object fundamental path (and its corresponding device fundamental path) in a subsequent browsing session would therefore be dependent on this particular application state. *See* FF 13-16.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's anticipation rejection of claims 5 and 6 over Stewart. Therefore, we will sustain the Examiner's rejection of those claims.

Claims 35 and 36

We will also sustain the Examiner's rejection of claim 35. Although this claim is broader than claim 3 in that only one applied force (not two) is recited, claim 35 nonetheless calls for a computer presentation of the interaction of objects simulating physical objects in the preamble.

We agree with the Examiner (Ans. 55-56) that nothing in the claim precludes Stewart's displayed representation of the input device as corresponding to a simulated physical object in addition to the virtual surface. As the Examiner indicates (Ans. 56), this simulated physical object moves along a defined object path (the virtual surface). We see no error in this position.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's anticipation rejection of claim 35 over Stewart. Therefore, we will sustain the Examiner's rejection of that claim, and claim 36 not separately argued.

THE OBVIOUSNESS REJECTIONS OF CLAIMS 9, 10, 14-18, 25, AND 34

Claim 9

In rejecting claim 9, the Examiner relies on Frid-Nielsen for teaching modifying a cursor's appearance when it is placed on a scroll bar to indicate valid inputs, and concludes that the claim would have obvious over the collective teachings of Rosenberg and Frid-Nielsen. (Ans. 11-13.)

Appellant argues that not only does Frid-Nielsen fail to mention force feedback, neither cited reference changes an object's visual representation based on its on-path or off-path condition as claimed. Appellant adds that there is no suggestion to combine the references as the Examiner proposes since, among other things, Frid-Nielsen does not suggest any force feedback, and Rosenberg fails to suggest combining its force feedback teachings with different cursor representation techniques. (Br. 22-23.)

Claim 10

In rejecting claim 10, the Examiner relies on Bertram for teaching plural scroll bars, each having a thumb, and concludes that it would have been obvious to modify Rosenberg's interface to have plural scroll bars (i.e., an additional object fundamental path) with a groove associated therewith. (Ans. 13-14.)

Appellant argues that the proposed combination does not teach or suggest two objects, but rather an interface with two scrollbars into which a user could move a single cursor. (Br. 23.) The Examiner, however, considers a scroll bar "thumb" to be an object, and, as such, the interface would have two object paths (two scroll bars) and two objects—one within each scroll bar. (Ans. 60-61.)

Claims 14 and 25

In rejecting representative claim 14, the Examiner relies on Rosenberg II for teaching applying a force to an input device to urge it towards a particular region of the device's range of motion (i.e., the "starting region") and combines this teaching with Rosenberg in concluding the claim would have been obvious. (Ans. 15-16.)

Appellant argues that Rosenberg II does not teach a "starting region" based on an object path, but rather centers the mouse to accommodate subsequent motion in any direction. (Br. 24.) The Examiner, however, notes that Rosenberg II's automatic centering process effectively urges the mouse to a starting region (i.e., the center). The Examiner adds that Rosenberg II also urges the input device away from the edge of its range of motion (i.e., within an "isometric" region) and towards the "isotonic" region. (Ans. 61-65.)

Claim 15

In rejecting claim 15, the Examiner relies on Gould for teaching that the path that the cursor moves on a screen (i.e., the "object fundamental path") can have a different shape than the path in which the interface device moves (the "device fundamental path").

Appellant argues that, unlike Rosenberg, Gould teaches an *alternative* to force feedback—not force feedback. As such, Appellant contends, not only does Gould fail to cure the deficiencies of Rosenberg, but combining the references as proposed would actually render Gould unsatisfactory for its intended purpose as an alternative to force feedback. (Br. 25.)

The Examiner, however, responds that not only is it known to combine virtual and actual force feedback, doing so would neither render Rosenberg nor Gould unsatisfactory for their intended purposes. Rather, the combination is based on adding virtual force feedback to Rosenberg's use of actual force feedback and, as such, the cited prior art does not teach away from its combination. (Ans. 65-67.)

Claims 16-18

Regarding representative claim 16, the Examiner cites Shih for teaching a two- or three-dimensional "object fundamental path" (i.e., a geometric constraint) that represents the path of a virtual tool object that is moved by an interface device in a "device fundamental path" in concluding the claim would have been obvious. (Ans. 18-20.)

Although Appellant acknowledges that Shih's virtual sculpting application would allow moving a tool in three dimensions, Appellant nonetheless argues that, by its very nature, Shih's virtual sculpting application requires the device and object paths to be *same shape* to effect sculpting. As such, Appellant contends, the proposed combination to yield differently-shaped paths would destroy Shih's utility for its intended purpose. (Br. 25-26.)

The Examiner, however, contends that since the virtual object to be sculpted and the representation of the input device are displayed to the user, the user can simply observe the tool's relation to the virtual object rather than relying solely on force feedback. In any event, the Examiner notes that

force feedback may nonetheless be applied to the input device that would result in a differently shaped path than the displayed object fundamental path. (Ans. 67-68.)

Claim 34

Regarding claim 34, Appellant argues that the groove interaction in Rosenberg requires that the paths have the same shape and a one-to-one correspondence. Appellants add Gould discloses differently shaped paths are an alternative to force feedback, and the non-one-to-one correspondence in Rosenberg II pertains to motion that not based on any object or device paths and that combining the references as proposed would change the basic principle of operation of the cited references. (Br. 26-27.)

The Examiner, however, notes that Rosenberg need not have a one-to-one correspondence between the motion of the cursor and the input device, and reiterates that merely adding virtual force feedback of Gould to Rosenberg would not defeat the intended purpose of the prior art. The Examiner adds that Rosenberg II's non-one-to-one correspondence may accommodate any input device motion, not just motion based on object or device paths. (Ans. 68-70.)

THE OBVIOUSNESS REJECTION OVER MEREDITH AND ROSENBERG

Regarding claim 32, the Examiner finds that Meredith's computerized pool cue and control system discloses all of the claimed subject matter except for applying for the input device responsive to a component of input

device motion not along the device fundamental path, and relies on Rosenberg for this teaching in concluding the claim would have been obvious. (Ans. 21-22.)

Appellant argues that Meredith does not teach force feedback, let alone that the interface affects pool cue motion. Rather, Appellant contends, users in Meredith freely manipulate a real pool cue that would be replaced with simulated groove forces if modified as proposed. According to Appellant, such a modification would change Meredith's principle of operation and render it unsuitable for its intended purpose. (Br. 27.)

The Examiner, however, disagrees and contends that adding force feedback to Meredith would still allow the user to freely move the pool cue. (Ans. 71.)

THE OBVIOUSNESS REJECTION OVER BAYNTON, ROSENBERG, AND MEREDITH

Claim 31

Regarding claim 31, the Examiner finds that Baynton discloses a computerized golf swing apparatus with force feedback, but does not disclose establishing an object fundamental path where (1) the object comprises a golf club, and (2) the object moves along the object fundamental path responsive to a component of input device motion along the device fundamental path. The Examiner, however, relies on Rosenberg and Meredith for these teachings in concluding the claim would have been obvious. (Ans. 22-24.)

Appellant argues that Baynton is a golf swing training apparatus that not only lacks force feedback based on object interaction in a computer application, but also lacks any suggestion of golf simulations or computer

games. According to Appellant, the proposed modification to Baynton would require redesigning Baynton to sense golf club motion rather than control its motion—a completely different purpose. (Br. 27-28.)

The Examiner responds that Rosenberg and Meredith collectively teach (1) applying a pool cue input to a computer; (2) applying force feedback; and (3) providing interaction of a simulated pool cue with other objects. According to the Examiner, Baynton shows that golf—like pool—is a popular activity and that skilled artisans could have likewise applied the teachings of Rosenberg and Meredith to a golf club such as that disclosed by Baynton. (Ans. 71-72.)

Claim 38

Regarding claim 38, Appellant argues that Baynton cannot be modified to have differently-shaped object and device paths as the Examiner proposes if it is to function for its intended purpose, namely to teach correct golf swings to athletes. (Br. 28.) The Examiner, however, notes that Rosenberg teaches such a feature and that such a modification is therefore suggested by the cited prior art. (Ans. 73.)

THE OBVIOUSNESS REJECTION OVER STEWART AND ROSENBERG II

Regarding claim 37, the Examiner finds that Stewart discloses all of the claimed subject matter except for moving the object and applying force responsive to a signal indicating that the user desires such interaction. The Examiner, however, relies on Rosenberg II's application of force feedback responsive to detecting a user-activated safety switch in concluding the feature would have been obvious. (Ans. 24-25, 74.)

Appellant argues that Rosenberg II's safety switch disables all haptic interaction—a result that differs from the claimed signal that disables forces specific to the path-based motion. (Br. 29.)

The issues before us, then, are as follows:

ISSUES

(1) Has Appellant shown that the Examiner erred in finding that Rosenberg and Frid-Nielsen collectively teach or suggest a perceptively different visual representation of the haptic input device depending on whether the input device is on the device fundamental path in rejecting claim 9 under § 103?

(2) Has Appellant shown that the Examiner erred in finding that Rosenberg and Bertram collectively teach or suggest establishing (1) a second object fundamental path representing a path of motion of a second object in the computer application, and (2) a second device fundamental path corresponding to the second object fundamental path in rejecting claim 10 under § 103?

(3) Has Appellant shown that the Examiner erred in finding that Rosenberg and Rosenberg II collectively teach or suggest applying a force to the input device to urge it to a starting region of its range of motion in rejecting claim 14 under § 103?

(4) Has Appellant shown that the Examiner erred in finding that Rosenberg and Gould collectively teach or suggest an object fundamental path and device fundamental path with different shapes in rejecting claim 14 under § 103?

(5) Has Appellant shown that the prior art cited to reject claim 14 teaches away from its combination?

(6) Has Appellant shown that combining the references to arrive at the invention of claims 15, 32, 34, and 38 would render the prior art unsuitable for its intended purpose?

(7) Has Appellant shown that the Examiner erred in finding that Baynton, Rosenberg, and Meredith collectively teach a golf simulation where the object fundamental path comprises a path suited for perception of the swing of a golf club in rejecting claim 31 under § 103?

(8) Has Appellant shown that the Examiner erred in finding that Stewart and Rosenberg II collectively teach moving the object in accordance with a signal indicating that the user desires path interaction in rejecting claim 37 under § 103?

(9) Is the Examiner's reason to combine the teachings of these references supported by articulated reasoning with some rational underpinning to justify the Examiner's obviousness conclusion?

FINDINGS OF FACT

The record supports the following additional findings of fact (FF) by a preponderance of the evidence:

17. Frid-Nielsen discloses an "intelligent screen cursor" 275 that indicates the valid inputs of a pointing device at all times. Unlike the cursor 225 shown in Figure 5A, the intelligent cursor 275 shown in Figure 5B graphically displays the valid inputs available to the user at various points (1)-(4) along its path of movement with respect to scroll bar 217. (Frid-Nielsen, col. 8, ll. 30-48; Figs. 5A and 5B).

18. Bertram in Figure 3 shows a GUI window 60 with vertical and horizontal scroll bars 64 and 70. Each scroll bar has an associated slider 62 and 68, respectively. (Bertram, col. 7, l. 1 − col. 8, l. 16; Fig. 3.)

19. Rosenberg II discloses a system with enhanced cursor control and force feedback in a mouse device 10 using an indexing feature. In one implementation, an indexing force (i.e., a resistive spring or restoring force) opposes the mouse's motion from an "isotonic" region 443 to an "isometric" region 442.[6] The magnitude and direction of the isometric spring force is based on the mouse position within the isometric region 442. (Rosenberg II, col. 29, ll. 24-47; col. 31, l. 44 − col. 32, l. 32; Figs. 5 and 9.)

20. Rosenberg II discloses an "auto centering" feature that uses the actuators 64 of the force feedback mouse to automatically reduce the offset between the local and display frames. To this end, the mouse is automatically moved to a location in the local frame corresponding to the center of the display frame. Alternatively, the user can auto center the mouse via a special button or switch. (Rosenberg II, col. 37, ll. 44-61.)

21. Gould discloses a virtual force feedback system that alters the motion of a cursor as it travels. As shown in Figure 10A, the motion of pointing device 12 is linear, but the motion of cursor 180 does not match this linear path in the vicinity of attractive forces 172 associated with oval 174. (Gould, col. 6, ll. 44-62; col. 16, ll. 48-60; Fig. 10A.)

---

[6] An "isometric region" borders an "isometric limit" which is a physical limit to the mouse workspace (e.g., a relatively small edge region). *See* Rosenberg II, col. 30, l. 62 − col. 31, l. 3; *see also id.* at col. 31, ll. 22-30. An "isotonic" region, however, borders an isometric region and allows normal isotonic mouse positioning. *See id.* at col. 31, ll. 24-26.

22. Shih discloses a haptic virtual environment including a virtual object 26 (e.g., a three-dimensional block) and a virtual tool 28 that is manipulated via a haptic interface device 10. Unless the haptic rendering process 16 uses the virtual tool 28 to remove material from the virtual object 26, then the rendering process does not allow the virtual tool to penetrate the virtual object. (Shih, col. 8, l. 21 − col. 9, l. 23; Figs. 2A and 2B.)

23. Meredith discloses a computerized pool cue 12 and controller 12 comprising a control ring 52 and case 32. During operation, the user fits the cue through the controller's control ring 52 and maneuvers the case to a desired position. Movement of the case and the cue is observed on a display device 122 (e.g., a computer screen) with respect to game balls on the screen. By actually seeing the cue move on the screen, the user can, among other things, align the cue's tip 18 with respect to the ball to be hit. (Meredith, col. 3, ll. 7-16; col. 5, ll. 15-30; Figs. 1, 2, 4, and 12.)

24. Baynton discloses a golf swing training and correction system comprising a computer-controlled mechanical manipulation mechanism for the controlling the position and orientation of a golf club 1000 within a predetermined swing path geometry. The computer control system monitors the coordinates associated with the golf club position throughout the entire swing path and applies an appropriate corrective force to the golf club. (Baynton, Abstract; col. 5, ll. 63-67; col. 6, l. 54 − col. 7, l. 7; col. 12, ll. 23-33; Figs. 1 and 10.)

25. Baynton's control system includes a PC with a GUI designed to, among other things, display information about both the calculated swing and the actual swing. (Baynton, col. 11, ll. 7-12.)

26. The signals provided to each position control actuator in Baynton could be used to provide visual feedback such as a display on a CRT. (Baynton, col. 12, ll. 34-36.)

27. In Rosenberg, the position of cursor 506 is directly related to the position of user object 34. Thus, when cursor 506 is moved left on screen 20, user object is moving in a corresponding direction. But the distance that user object 34 moves may not be the same distance that cursor moves on the screen, and is typically related by a predetermined function. (Rosenberg, col. 48, ll. 56-64.)

28. In Rosenberg II, safety or "deadman" switch 150 is included in the interface device to (1) enable the user to override and deactivate actuators 64, or (2) require a user to activate actuators 64. Safety switch 150 is coupled to actuators 64 such that the user must continually activate or close the safety switch during manipulation of the mouse to activate the actuators 64. If the safety switch is deactivated, power is cut to the actuators. (Rosenberg II, col. 17, ll. 47-67; Fig. 4.)

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966) (noting that 35 U.S.C. § 103 leads to three basic factual inquiries: (1) the scope and content of the

prior art; (2) the differences between the prior art and the claims at issue; and (3) the level of ordinary skill in the art). Furthermore, the Examiner's obviousness rejection must be based on

> "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness" . . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

KSR Int'l v. Teleflex, Inc., 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

If the Examiner's burden is met, the burden then shifts to the Appellant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

If the Examiner's proposed modification renders the prior art unsatisfactory for its intended purpose, the Examiner has failed to make a prima facie case of obviousness. *See In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984).

ANALYSIS

Claim 9

We will sustain the Examiner's rejection of claim 9 which calls for a perceptively different visual representation of the haptic input device depending on whether the input device is on the device fundamental path. We see no error in the Examiner's position (Ans. 56-60) that skilled artisans

would have combined Frid-Nielsen's teaching of changing the visual representation of a cursor in accordance with its position with respect to a scroll bar (*see* FF 17) with Rosenberg—a reference which teaches providing force feedback associated with a cursor's position with respect to a scroll bar as we noted previously. *See* FF 4-5. Providing visual feedback to users to inform them of available input device functions as taught by Frid-Nielsen in conjunction with the force feedback system of Rosenberg is tantamount to the predictable use of prior art elements according to their established functions—an obvious improvement. *See KSR*, 550 U.S. at 417. The Examiner's reason to combine the teachings of these references is therefore supported by articulated reasoning with some rational underpinning to justify the Examiner's obviousness conclusion.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 9. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 10

We will sustain the Examiner's obviousness rejection of claim 10 calling for, in pertinent part, establishing (1) a second object fundamental path representing a path of motion of a second object in the computer application, and (2) a second device fundamental path corresponding to the second object fundamental path. We see no error in the Examiner's position (Ans. 60-61) that combining Bertram's teaching of plural scroll bars with associated sliders (FF 18) with Rosenberg's interface would provide two object fundamental paths (and associated device fundamental paths). We see no reason why each scroll bar's "thumb" could not constitute a separate

object as the Examiner indicates (Ans. 60-61). Providing such functionality in Rosenberg is tantamount to the predictable use of prior art elements according to their established functions—an obvious improvement. *See KSR*, 550 U.S. at 417. The Examiner's reason to combine the teachings of these references is therefore supported by articulated reasoning with some rational underpinning to justify the Examiner's obviousness conclusion.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 10. Therefore, we will sustain the Examiner's rejection of that claim.

Claims 14 and 25

We will sustain the Examiner's rejection of claim 14 which calls for, in pertinent part, applying a force to the input device to urge it to a starting region of its range of motion. We agree with the Examiner (Ans. 61-64) that Rosenberg II's automatically centering the mouse (FF 20) at least suggests urging the mouse to a starting region of its range of motion, namely the center. As the Examiner indicates (Ans. 63), Appellant's argument that Rosenberg II does not determine a starting region based on object path (Br. 24) is not commensurate with the scope of the claim. Additionally, the Examiner's point (Ans. 63-64) that motion of the input device along the device fundamental path starting from this "starting region" should not generally require motion outside its range of motion is well taken. We reach a similar conclusion with respect to Rosenberg II's urging the mouse from an isometric region to an isotonic region. *See* FF 19.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 14. Therefore, we will sustain the Examiner's rejection of that claim, and claim 25 not separately argued.

Claim 15

We will also sustain the Examiner's rejection of claim 15 which calls for the object fundamental path and device fundamental path to have different shapes. At the outset, we note that nothing in the claim precludes a joystick implementation of Rosenberg (*see* FF 1). In this case, the device fundamental path in Rosenberg would be, at least in part, curved or arc-shaped in multiple dimensions, and would have a different shape than the object fundamental path represented on the display. Since Rosenberg itself meets claim 15, the Examiner's reliance on Gould is merely cumulative.

Nevertheless, even assuming, without deciding, that Gould's virtual force feedback (FF 21) is an alternative to actual force feedback (such as that disclosed by Rosenberg) as Appellant seems to suggest (Br. 25), we see no reason why such a virtual force feedback could not function as an adjunct to Rosenberg's actual force feedback system as the Examiner indicates (Ans. 66). Such an enhancement would be tantamount to the predictable use of prior art elements according to their established functions—an obvious improvement. *See KSR*, 550 U.S. at 417.

We recognize, however, that if the Examiner's proposed modification renders the prior art unsatisfactory for its intended purpose, the Examiner has failed to make a prima facie case of obviousness. *See Gordon*, 733 F.2d at 902. But we see no reason why merely adding a virtual force feedback

feature as suggested by Gould to Rosenberg's actual force feedback as the Examiner proposes would not render either reference unsuitable for its intended purpose. The Examiner's reason to combine the teachings of these references is therefore supported by articulated reasoning with some rational underpinning to justify the Examiner's obviousness conclusion.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 15. Therefore, we will sustain the Examiner's rejection of that claim.

Claims 16-18

We will also sustain the Examiner's rejection of representative claim 16 which calls for the device fundamental path to define a curve in three dimensions. As we noted above, we find that Rosenberg's joystick implementation (FF 1) also fully meets this limitation.

Nevertheless, Appellant acknowledges (Br. 26) that Shih allows moving the virtual tool in three dimensions. And as the Examiner indicates (Ans. 67-68), movement of the displayed virtual tool may not exactly match that of the input device (*see* FF 22) and therefore force feedback could be used in such a condition. Furthermore, sculpting is not the only technique envisioned by Shih's haptic rendering process. *See id.* As such, we fail to see how applying these techniques to the other cited prior art would render the prior art unsuitable for its intended purpose.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 16. Therefore, we will sustain the Examiner's rejection of that claim, and claims 17 and 18 not separately argued.

Claim 34

We will also sustain the Examiner's rejection of claim 34 which calls for the correspondence between the device fundamental path and the object fundamental path to not be one-to-one. At the outset, we note that nothing in the claim precludes a joystick implementation of Rosenberg (*see* FF 1) as we noted previously. As such, the device fundamental path established by the joystick would, at least in part have a different shape than the object fundamental path represented on the display and therefore not have a one-to-one correspondence. Since Rosenberg itself meets claim 34, the Examiner's reliance on Gould is merely cumulative.

Nevertheless, as we indicated previously, we see no error in combining Gould with Rosenberg to provide virtual force feedback as an adjunct to actual force feedback. And we further see no error in the Examiner's position (Ans. 69-70) that skilled artisans could combine Gould's teaching of differently-shaped paths with Rosenberg. As the Examiner indicates, while Rosenberg's groove is intended to aid the user in moving a cursor along an interface object (e.g., a scrollbar) (FF 3-5), we are not persuaded that providing differently-shaped paths in Gould would somehow destroy Rosenberg's functionality. Rather, such an enhancement is tantamount to the predictable use of prior art elements according to their established functions—an obvious improvement. *See KSR*, 550 U.S. at 417.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 34. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 32

We will also sustain the Examiner's rejection of claim 32 which calls for, in pertinent part, a pool simulation application where the object fundamental path comprises a path suited for perception of a the motion of a pool cue. We disagree with Appellant's contention (Br. 27) that adding force feedback to Meredith's pool simulation would render it unsuitable for its intended purpose. To the contrary, we see no reason why adding force feedback such as that suggested by Rosenberg would not still allow the user in Meredith to use the pool cue in that system as the Examiner indicates (Ans. 71). *See* FF 23. While there may be some resistance forces applied via this modification, the user would still be able to use the cue, its associated controller, and the simulation. Indeed, applying feedback forces in Meredith's system may actually cause the user to play *better* as the applied forces could function as a training aid. *See id.*

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 32. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 31

We will also sustain the Examiner's obviousness rejection of claim 31 based on the collective teachings of Baynton, Rosenberg, and Meredith. It is true that Baynton's mechanical golf training system differs from that of Meredith's display-based simulation. *Compare* FF 23 *with* FF 24. Nevertheless, we see no reason why the pool simulation system with force feedback of the Meredith/Rosenberg system could not be adapted for golf simulations in light of Baynton as the Examiner suggests (Ans. 72).

Not only do both games involve striking a ball with a handheld implement to direct the ball in a desired direction and velocity, Baynton all but suggests that visual feedback is used in addition to force feedback as part of the golf training system. For example, Baynton notes that a GUI on the control system's PC can display information about the actual swing (FF 25), and control actuator signals can be used to provide visual feedback on a display (FF 26). Since (1) Baynton envisions visually displaying aspects of the golf swing in addition to applying force feedback, and (2) in view of the similar fundamental aspects of pool and golf (e.g., hitting a ball with a handheld implement to direct it in a desired direction and velocity), we see no reason why the Meredith/Rosenberg system could not be adapted for golf simulations in lieu of, or in addition to, pool simulations.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 31. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 38

Regarding claim 38, we are not persuaded of error in the Examiner's position (Ans. 73) that Baynton, Rosenberg, and Meredith collectively teach a golf simulation apparatus where the object and device fundamental paths have different shapes. As we indicated previously with respect to claim 31, we see no reason why the Meredith/Rosenberg system could not be adapted for golf simulations in lieu of, or in addition to, pool simulations. Such a modification would hardly render this system unsuitable for its intended purpose. And as the Examiner indicates (Ans. 73), Rosenberg at least suggests providing differently-shaped object and device paths based, in part,

on the disparity between the relative movement of the cursor and user object. *See* FF 27. As such, we find that the cited prior art collectively teaches and suggests all limitations of claim 38.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 38. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 37

We will also sustain the Examiner's obviousness rejection of claim 37 which calls for, in pertinent part, moving the object in accordance with a signal indicating that the user desires path interaction. We see no error in the Examiner's reliance (Ans. 74) on the user's activation of the safety switch in Rosenberg II (FF 28) for this feature. We agree with the Examiner that since the user must affirmatively actuate the safety switch to activate the actuators to effect force feedback, then a signal would be accepted indicating that path interaction was desired. Even if we assume, without deciding, that this safety switch disables all haptic interaction as Appellant argues (Br. 29), the scope of the claim simply does not preclude this feature.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's obviousness rejection of claim 37. Therefore, we will sustain the Examiner's rejection of that claim.

CONCLUSIONS

Appellant has not shown that the Examiner erred in rejecting claims 3, 4, 7, 8, 11-13, 19-24, and 26-30 under § 102 over Rosenberg. Nor has Appellant shown that the Examiner erred in rejecting claims 3, 5, 6, 35, and 36 over Stewart under § 102.

Also, Appellant has not shown that the Examiner erred in rejecting claims 9, 10, 14-18, 25, 31, 32, 34, 37, and 38 under § 103.

ORDER

The Examiner's decision rejecting claims 3-32 and 34-38 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

pgc

V. Gerald Grafe, esq.
P.O. Box 2689
Corrales, NM 87048